

ALUMINUM WINDOWS

1957

SPECIFICATIONS


**QUALITY
APPROVED**

(TYPE)

A.W.M.A. Quality Specifications—Materials, Construction, Strength of sections and Air Infiltration requirements—confirmed by PITTSBURGH TESTING LABORATORY.
MEMBER—ALUMINUM WINDOW MANUFACTURERS ASSOCIATION



what the quality-approved seal means 2

how to use AWMA specifications 4

 short form specification 5
 (for use with all types of windows)

master specification 5

section 1—general requirements 6

section 2—specific requirements 6

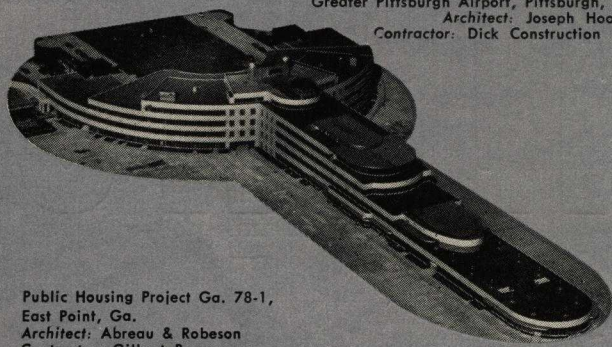
type	application	specification	
double-hung	residential	DH-A1	8
	commercial	DH-A2	9
	monumental	DH-A3	11
casement	residential	C-A1	12
	commercial	C-A2	14
	monumental	C-A3	15
projected	residential	P-A1	16
	commercial	P-A2	17
awning	residential	A-A1	18
	commercial	A-A2	19
sliding	residential	DS-A1	20
jalousie	residential	J-A1	22
Specification and design check list			24
standard sizes			26

*Aluminum Window
Manufacturers Association*

75 West Street, New York 6, N. Y.



Clinton Memorial Hospital,
Wilmington, Ohio
Architect: Marlay W. Lethly
Contractor: Sever Williams



Greater Pittsburgh Airport, Pittsburgh, Pa.
Architect: Joseph Hoover
Contractor: Dick Construction Co.

Public Housing Project Ga. 78-1,
East Point, Ga.
Architect: Abreau & Robeson
Contractor: Gilbert Beers



Saddle Rock Elementary School, Great Neck, N. Y.
Architects: Starrett & Van Vleck, Reginald E. Marsh
Contractor: William A. Berbusse, Jr., Inc.



McShain Building, Washington, D. C.
Architect: Edwin Weihne
Contractor: John McShain, Inc.



What the "quality-approved" seal means to the building industry

The "Quality-Approved" Seal is a mark of quality. It assures windows (double-hung, casement, projected, awning, sliding and jalousie types) that meet the specifications of the Aluminum Window Manufacturers Association.

These specifications and minimum structural standards covering quality of materials, construction, strength of sections and minimum air infiltration requirements were established by the Association for the protection of all who specify, buy or use aluminum windows.

Use of the "Quality-Approved" Seal is *not* limited to members of the Association. Any manufacturer—whether a member of the Association or not—whose windows when tested by the independent Pittsburgh Testing Laboratory, meet these minimum standards can qualify for use of the "Quality-Approved" Seal.

The "Quality-Approved" Seal, featuring the copyrighted emblems of the Aluminum Window Manufacturers Association and of the Pittsburgh Testing Laboratory, is the joint guarantee of the Association and of the Laboratory, *first* (on the part of the Association) that these minimum specifications, that if followed in letter and spirit will insure a worthy product, *second* (on the part of the Laboratory) that a sample of the particular window on which the "Quality-Approved" Seal is displayed, did, in fact, meet or exceed these requirements. Unauthorized use of the "Quality-Approved" Seal will be prosecuted. Its use will be authorized impartially and scrupulously in the public interest to all who comply with the rules and regulations as published by the Association and the Pittsburgh Testing Laboratory, and whose products are found to fulfill these specifications.

For clients' protection, specify windows that carry the "Quality-Approved" Seal.

Aluminum Window Manufacturers Association

75 WEST STREET, NEW YORK 6, N. Y.



Specify

aluminum windows

and give your clients all these advantages . . .

For schools, for hospitals, for commercial, monumental and industrial buildings, and for residential buildings, both large and small—aluminum windows offer many outstanding advantages—advantages that will be appreciated by your clients—enhance his building investment.

NEVER NEED PAINTING

Aluminum windows will not rust-streak or rot. They are not subject to attack by termites. They never need to be painted. This means a continuous saving, year after year, that in many cases soon exceeds the original cost of the windows themselves.

LOW MAINTENANCE

Aluminum windows require practically no maintenance, no painting, no replacements—ever. Aluminum windows are easy to maintain and keep clean. Wiping them with a damp cloth occasionally is sufficient.

GOOD LOOKS

The smart, trim appearance, narrow frames, increased glass areas of modern aluminum windows add to the attractiveness of any structure. They harmonize with almost any style of architecture and their clean, neutral color blends with any color scheme.

EASE OF OPERATION

Aluminum windows always open easily—close tightly. They cannot warp, swell or stick. They will never be "painted shut."

YEARS OF TROUBLE-FREE SERVICE

"Quality-Approved" aluminum windows are made from strong aluminum sections that will not wear out or need replacement. Hardware and all moving parts are rigid and strong.

TESTED

For
Sound
Construction



TESTED

For
Strength
of Sections



TESTED

For
Low
Air Infiltration



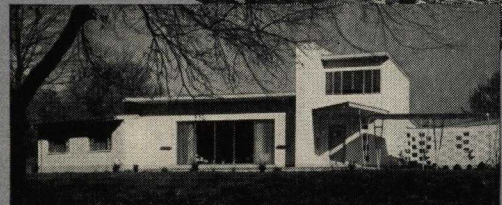
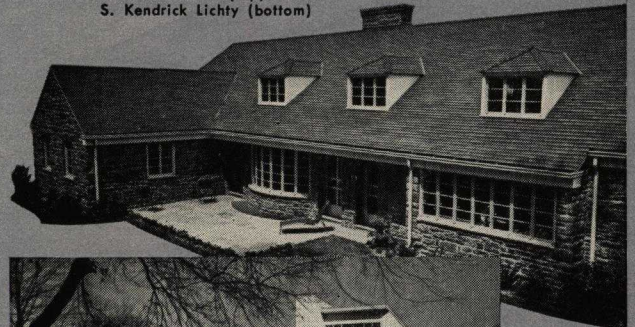
East Bronx Tuberculosis Hospital, Bronx, N. Y.
Architects: Pomerance & Breines
Contractor: Gerace & Castagna



Parklabrea Apartments, Los Angeles, Cal.
Architects: Leonard Schultze & Associates



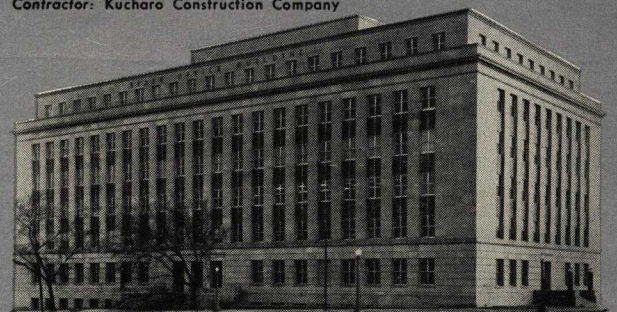
Residences at North Hills, Pa. and Bryn Mawr, Pa.
Architects: Julian H. Jacob (top)
S. Kendrick Lichty (bottom)



St. Joseph's Parochial High School,
Camden, N. J.
Architect: Thomas J. Earley



State Office Building, Des Moines, Iowa
Architects: Tinsley, Higgins & Lighter
Contractor: Kuchar Construction Company





Colwyck School, Wilmington, Del.
Architect: E. Will Martin
Contractor: Rupert Construction Co.



Lenchire House, Washington, D. C.
Architect: George T. Santmeyers
Contractor: Lenkin Const. Co.



Texaco Building, New Orleans, La.
Architect: Claude E. Hooten
Contractor: Haase Construction Co., Inc.



State Office Building, Jefferson City, Mo.
Architect: Marcel Boulicault
Contractor: MacDonald Construction Co.

How to use these specifications

In an endeavor to simplify the writing of specifications for "Quality-Approved" aluminum windows the Technical Committee of the Aluminum Window Manufacturers Association offers a short form specification as well as a complete master specification in two parts.

Use of the short form specification is recommended wherever possible. It may be used for any type of aluminum window by merely inserting the specific type or types ordered. The short form specification will save you time, while assuring full compliance on the part of the bidder with the complete detailed specification.

Where a complete detailed specification is required copy Section 1 in full. Then, follow with the specific portion of Section 2 that covers the type of windows required.



Lankenau Hospital, Philadelphia, Pa.
Architect: Vincent G. Kling
Contractor: Wark & Co.

Sunshine Biscuit Co.,
Kansas City, Kansas
Architect: M. C. Haley
Contractor: Swanson Const. Co.



ALUMINUM WINDOWS

as revised September 1, 1956

DOUBLE-HUNG
AWNING

CASEMENT
SLIDING

PROJECTED
JALOUSIE

short form specification

NOTE: The following is a short form specification covering aluminum windows:

All aluminum windows of the types and sizes shown on the drawings and to be furnished under this contract shall be manufactured by or or equal to conform to all requirements for "Quality-Approved" aluminum windows in the Aluminum Window Manufacturers Association Master Specification (choose the applicable designation(s) from the following:)

DH-A1—Double-Hung (and Single-Hung) Windows for Residential-Type Buildings

DH-A2—Double-Hung (and Single- and Triple-Hung) Windows for Commercial-Type Buildings

DH-A3—Double-Hung (and Single- and Triple-Hung) Windows for Monumental-Type Buildings

C-A1—Casement Windows for Residential-Type Buildings

C-A2—Casement Windows for Commercial-Type Buildings

C-A3—Casement Windows for Monumental-Type Buildings

P-A1—Projected Windows for Residential-Type Buildings

P-A2—Projected Windows for Commercial- and Monumental-Type Buildings

A-A1—Awning Windows for Residential-Type Buildings

A-A2—Awning Windows for Commercial- and Monumental-Type Buildings

DS-A1—Double-Sliding (and Single-Sliding) Windows for Residential-Type Buildings

J-A1—Jalousie Windows for Residential-Type Buildings

as published in Sweet's File, Architectural, latest edition, and available from the Aluminum Window Manufacturers Association, 75 West Street, New York 6, N. Y. Erection, glass, glazing clips, glazing compound, glazing, caulking compound, caulking, grouting and cleaning-after-erection shall be by others.

master specification

NOTE: To form a complete specification to cover aluminum windows of one or more types which you desire for your requirements use Section 1 in its entirety and combine with it one or more of the following portions of Section 2:

DH-A1—Double-Hung (and Single-Hung) Windows for Residential-Type Buildings (Page 8)

DH-A2—Double-Hung (and Single- and Triple-Hung) Windows for Commercial-Type Buildings (Page 9)

DH-A3—Double-Hung (and Single- and Triple-Hung) Windows for Monumental-Type Buildings (Page 11)

C-A1—Casement Windows for Residential-Type Buildings (Page 12)

C-A2—Casement Windows for Commercial-Type Buildings (Page 14)

C-A3—Casement Windows for Monumental-Type Buildings (Page 15)

P-A1—Projected Windows for Residential-Type Buildings (Page 16)

P-A2—Projected Windows for Commercial- and Monumental-Type Buildings (Page 17)

A-A1—Awning Windows for Residential-Type Buildings (Page 18)

A-A2—Awning Windows for Commercial- and Monumental-Type Buildings (Page 19)

DS-A1—Double-Sliding (and Single-Sliding) Windows for Residential-Type Buildings (Page 20)

J-A1—Jalousie Windows for Residential-Type Buildings (Page 22)

SECTION 1

NOTE: This section contains the general requirements applicable to all aluminum windows and is to be used in conjunction with Section 2.

1.1 GENERAL AND SCOPE

All aluminum windows of the types and sizes shown in the plans and/or as called for in this specification shall be furnished with all necessary hardware, anchors, and miscellaneous equipment as herein specified and shall be manufactured byor.....or equal. Erection, glass, glazing clips, glazing compound, glazing, caulking compound, caulking, grouting and cleaning after erection shall be by others.

1.2 MATERIALS

1.2.1 Alloys. Aluminum shall be of commercial quality and of proper alloy for window construction, free from defects impairing strength and/or durability, as follows:

Wrought aluminum alloys shall be those in which the alloying elements do not exceed the following maximum limits:

Silicon	7.0%	Iron	1.0%
Magnesium	Total	Copper	0.4%
Manganese		Zinc	1.0%
Chromium		Others	0.5%
Balance Aluminum			

These limits apply to both bare products and the core of clad products. The cladding of clad products shall be within the same limits except that the maximum zinc limit may be 3.0% in order to assure that the cladding is anodic to the core.

1.2.2 Window, Screen and Storm Window Members. All window members including muntin bars shall be of aluminum. Material thickness for aluminum members shall be such as to adequately perform the functions for which they are designed. Reinforcing members, if used, shall be of aluminum or non-magnetic stainless steel.

1.2.3 Fasteners. Screws, nuts, washers, bolts, rivets and other miscellaneous fastening devices incorporated in the windows shall be of aluminum, non-magnetic stainless steel or other non-corrosive materials compatible with aluminum and shall be of sufficient strength to perform the functions for which they are used. Plated or coated materials, except on aluminum and non-magnetic stainless steel, are not permitted.

1.2.4 Hardware. Hardware having component parts which are exposed shall be of aluminum,

non-magnetic stainless steel or other non-corrosive materials compatible with aluminum and shall be of sufficient strength to perform the functions for which it is used. Plated or coated materials not compatible with aluminum are not permitted unless properly insulated from the aluminum.

1.2.5 Weather Strip. Weather strip where used shall be of material which is compatible with aluminum.

1.2.6 Moving Parts. There shall be no aluminum-to-aluminum contact between hardware parts or window members which are required to move relative to one another and at the same time remain in contact.

1.2.7 Anchors. All anchoring devices used in the erection of the windows shall be of aluminum, non-magnetic stainless steel or other non-corrosive materials compatible with aluminum. Steel anchors may be used provided that they be properly insulated from the aluminum.

1.3 CONSTRUCTION

1.3.1 Assembly. The windows shall be assembled in a secure and workmanlike manner to perform as hereinafter specified and to assure neat, weathertight construction. A permanent water-tight joint shall be made at the junction of the sill and side-frame members. Except for Sliding and Jalousie Windows individual windows having ventilating units shall be completely assembled at the plant of the manufacturer ready for shipment as a unit, except that muntin installation may be at the factory or in the field. When welding flux is used, it shall be completely removed immediately upon completion of the welding operation.

1.3.2 Hardware. The hardware shall be designed to perform the functions for which it is intended and shall be securely attached to the window.

1.3.3 Mullions. Where multiple-unit openings occur, the individual window units shall be joined together with the manufacturer's standard vertical mullion. Where special vertical or horizontal mullions are required for architectural or structural reasons, they shall be furnished by others unless otherwise specified.

1.3.4 Glazing. Except for Jalousie Windows, windows shall be designed for glazing with 1/8 inch glass unless otherwise specified. Adequate provision shall be made for use of glazing compound and, if specified, glazing beads of any material compatible with aluminum.

Approved WINDOWS

specifications

17A
Alu

1.4 FINISH

The exposed surfaces of all aluminum members shall be cleaned to make them reasonably uniform in color and free from serious surface blemishes. If exposed welded joints are used, they shall be dressed flush and finished to match adjacent surfaces.

1.5 PROTECTIVE COATING

1.5.1 Windows. A suitable protective coating shall be applied to all frame and sash members after fabrication. This applied coating on the aluminum surface must be such as to withstand the action of lime mortar for a period of at least one month in an atmosphere of 100% relative humidity at room temperature. The coating used shall be of a type to which the glazing compound will adhere. The preferred coating is a clear water-white methacrylate-type lacquer, resistant to alkaline mortar and plaster. Before application of the protective coating the manufacturer shall remove all fabrication compounds, dirt accumulations and/or steel wool fibers deposited by abrasion cleaning.

1.5.2 Sub-Frames. If steel sub-frames are used, all surfaces of the steel shall be insulated from direct contact with aluminum surfaces by a heavy coat of an alkali-resistant bituminous paint or a zinc-chromate primer coat or other coating suitable for this purpose. If wood sub-frames are used, the wood shall be properly treated with a preservative which will not promote corrosion of the aluminum. No part of the steel or wood sub-frame shall be left exposed on exterior of building.

1.6 AIR INFILTRATION

The manufacturer shall, when requested, furnish photostatic copies of a test made on a window identical in construction with windows being furnished under this specification. The test shall be made by a recognized testing laboratory showing that air infiltration did not exceed the applicable maximum limit as specified in Section 2 below. Except for Jalousie Windows, the amount of air infiltration shall be measured in terms of cubic feet per minute per foot of crack length when the window is subjected to a static air pressure equal to the pressure exerted by wind at a velocity of 25 miles per hour.

1.7 SCREENS

1.7.1 Screens shall be provided when specified and be of manufacturer's standard approved design, applicable to the specific windows for which it is intended.

1.7.2 Aluminum Screens shall have frames, either cold rolled or extruded aluminum and manufactured from a suitable alloy.

1.7.3 Frame shall be of sufficient rigidity and cross-braced as required to lie flat against window and prevent excessive bow in frame members and sag in screening. Screen spline shall be aluminum or a material compatible with aluminum.

1.7.4 Corners shall be firmly joined in a secure and workmanlike manner.

1.7.5 Screen shall be provided with approved fastening devices suited particularly for application to the specific window for which it is intended and of aluminum or a metal compatible with aluminum and of sufficient strength to perform satisfactorily.

1.7.6 Aluminum screen cloth shall be woven in 18x14 or 16x16 mesh of .013 dia. aluminum clad 5056 alloy wire with suitable coating.

1.8 DRAWINGS and INSTALLATION DETAILS

The window manufacturer shall furnish standard details showing recommendations for the installation of the windows.

1.9 ERECTION

The erection contractor shall securely anchor windows in place to a straight, plumb and level condition, without distortion of the windows, and shall make final adjustment for proper operation of ventilating units after glazing.

1.10 CAULKING

Windows shall be properly caulked by others with a suitable compound to accomplish a thoroughly weathertight installation around the perimeter of the window frame and wall opening.

1.11 GLAZING

Except for Jalousie Windows, the glazing contractor shall furnish a glazing compound which shall have a composition particularly adapted for use with aluminum windows and shall not require painting to protect it from drying out or deterioration. Any material to which the glazing compound will not readily adhere shall be removed from the glazing surfaces by the glazing contractor. If a methacrylate-type lacquer has been applied as the protective coating, it need not be removed. Glazing clips, or glazing beads if specified, shall be used with the glazing compound. The glass shall rest upon shims installed in accordance with accepted glazing procedure so that it will not rest upon any aluminum member.

1.12 CLEANING AFTER ERECTION

The General Contractor shall be responsible for the protection of the windows during the course of construction and for cleaning all portions of the window after painting and finishing of the building is completed.

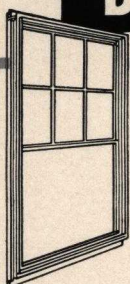
(NOTE: To complete the specification add here one or more portions of Section 2.)

SECTION 2

NOTE: This section contains the specific requirements applicable to particular types and classes of aluminum windows, and is to be used in conjunction with Section 1.

SPECIFICATION
DH-A1

DOUBLE-HUNG (and SINGLE HUNG) WINDOWS FOR RESIDENTIAL-TYPE BUILDINGS



(Section 1 in its entirety is a part of this specification.)

2.1.1 MATERIALS

Main frame and sash members shall not be less than 0.062" in thickness (*Accepted commercial tolerances*).

shall be of manufacturer's largest standard size, of standard construction, and at least 3'0" wide by 5'0" high.

2.1.2 CONSTRUCTION

2.1.2.1 Cut-outs to give access to the sash balances shall be neat and closely fitted. Meeting rails shall contact tightly with each other or with weatherstrips and with wedge blocks at jambs when closed.

2.1.2.2 Where Single-Hung windows are specified they shall meet all provisions applying to Double-Hung windows except that only one sash shall be required to operate.

2.1.3 HARDWARE

The windows shall be equipped with locks and lifts of suitable non-ferrous or non-magnetic stainless steel materials. Sash shall operate freely and be equipped with balancing mechanisms or other devices which will hold both sash stationary at any open position. The mechanisms used shall be easily accessible. Balances shall be installed in the plant of the manufacturer.

2.1.4 PERFORMANCE REQUIREMENTS

2.1.4.1 Physical Load Tests

NOTE: Sample submitted for Physical Load Test

A.—Horizontal Load Test. A concentrated load of 20 pounds, acting horizontally and applied at the center of the span of any horizontal sash rail assembled in the sash, shall not cause, before the sash are glazed, a horizontal deflection of more than 1/175 of its span and in no case shall the deflection exceed .219 inches.

B.—Vertical Load Test. A concentrated load of 20 pounds, acting vertically and applied at the center of the span of any horizontal rail assembled in the sash, shall not cause, before the sash are glazed, a vertical deflection of more than 1/375 of its span and in no case shall the deflection exceed .094 inches.

C.—Uniform Load Test. Under an exterior uniform load of 10 pounds per square foot, no member in completely assembled window without muntins, glazed, closed and locked, continuously supported around its outside perimeter and securely anchored, shall deflect more than 1/175 of its span.

NOTE: The span length of any horizontal sash member shall be considered as equal to the overall width of the sash provided for that size of window.

Approved WINDOWS

double-hung

17A
Alu

2.1.4.2 Air Infiltration Test

When tested in accordance with the procedure as outlined in Section 1 under AIR INFILTRATION, the air infiltration shall not exceed $\frac{3}{4}$ cubic foot per minute per foot of crack length with sash in closed position and locked. The sash shall have

been adjusted to operate in either direction with a force not exceeding 20 pounds after the sash is in motion. The nominal size of the window tested shall be 3'0" wide by 5'0" high or have a frame and integral sash perimeter equal thereto.

The following members of the Association manufacture a DH-A1 type window which has been tested and found to meet the requirements of this specification as of September 1, 1956. Up-to-date information on additional members qualifying under this specification may be obtained by writing to the Association office.

Ceco Steel Products Corporation, 5601 West 26th St., Chicago 50, Ill. (Series 200B)

Michael Flynn Mfg. Co., 700 East Godfrey Ave., Philadelphia 24, Pa. (Lupton DH)

Luria Building Products, Inc., P.O. Box 27, Bristol, Pa. (Series 60)

Metal Arts Mfg. Co., Inc., Harwell & Oakcliff Rd., Atlanta, Ga. (Series 100E)

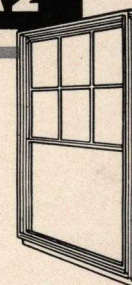
J. S. Thorn Company, 8501 Hegerman St., Philadelphia 36, Pa. (Series A-200)

Windalume Corporation, Route 46, Kenil, N. J. (Series 100)

DOUBLE-HUNG (and SINGLE- and TRIPLE-HUNG) WINDOWS FOR COMMERCIAL-TYPE BUILDINGS

SPECIFICATION
DH-A2

(Section 1 in its entirety is a part of this specification.)



2.2.1 MATERIALS

Main frame and sash members (excluding sills) shall not be less than 0.062" in thickness. Sill members not reinforced by sub-frames or by proper stiffening ribs shall not be less than 0.078" in thickness. (Accepted commercial tolerances).

2.2.2 CONSTRUCTION

2.2.2.1 Cut-outs to give access to the sash balances shall be neat and closely fitted. Meeting rails of sliding sash shall contact tightly with each other or with weatherstrips and with wedge blocks at jambs when closed.

2.2.2.2 Where Single-Hung or Triple-Hung windows are specified they shall meet all provisions applying to Double-Hung windows except that one sash and three sash respectively shall be required to operate.

2.2.3 HARDWARE

2.2.3.1 The lower sash shall have two grips or bar lifts attached to the lower rail or shall have a continuous lift, except that for sash less than 3'0" wide between stops one grip or bar lift will be required.

2.2.3.2 When specified, the upper sash shall have two pull handles at the underside of its meeting rail, except that for sash less than 3'0" wide between stops one pull handle will be required.

2.2.3.3 Where meeting rails are over 6 feet above the finished floor, pull handles shall be omitted and the upper sash shall be provided with a pull-down socket at the inner side of its top rail for pole operation.

2.2.3.4 Unless otherwise specified, holes for shade brackets shall be omitted. If shade brackets are specified, provision for them shall be made on all windows by two clear holes, to receive self-

tapping screws, spaced $1\frac{1}{4}$ inches on center and located in the upper corner of each window, as directed by the architect. Shade brackets will be furnished and installed under another contract.

2.2.3.5 Sash shall operate freely and be equipped with balancing mechanisms or other devices which will hold sash stationary at any open position. The mechanisms used shall be easily accessible. Balances shall be installed in the plant of the manufacturer.

2.2.3.6 Unless otherwise specified, provision for window cleaner anchors shall be omitted. If window cleaner anchors are specified to be secured to the window frame, the frame shall be reinforced as may be required to receive the window cleaner anchors, and the window frames shall be anchored securely to the wall construction at the point of application of the window cleaner bolts.

2.2.4 PERFORMANCE REQUIREMENTS

2.2.4.1 Physical Load Tests

NOTE: Sample submitted for Physical Load Tests shall be of manufacturer's largest standard size, of standard construction, and at least 4'6" wide by 7'6" high.

A.—Horizontal Load Test. A concentrated load of 30 pounds, acting horizontally and applied at the center of the span of any horizontal sash rail, shall not cause, before the sash are glazed, a horizontal deflection of more than $1/175$ of its span and in no case shall the deflection exceed .250 inches.

B.—Vertical Load Test. A concentrated load of 30 pounds, acting vertically and applied at the center of the span of any horizontal sash rail, shall not cause, before the sash are glazed, a vertical deflection of more than $1/375$ of its span and in no case shall the deflection exceed .160 inches.

C.—Uniform Load Test. Under an exterior uniform load of 15 pounds per square foot, no member in a completely assembled window without muntins, glazed, closed and locked, continuously supported around its outside perimeter and securely anchored, shall deflect more than $1/175$ of its span.

NOTE: The span length of any horizontal sash member shall be considered as equal to the overall width of the sash provided for that size of window.

2.2.4.2 Air Infiltration Test

When tested in accordance with the procedure as outlined in Section 1 under AIR INFILTRATION, the air infiltration shall not exceed $\frac{1}{2}$ cubic foot per minute per foot of crack length with sash in closed position and locked. The sash shall have been adjusted to operate in either direction with a force not exceeding 35 pounds after the sash is in motion. The nominal size of the window tested shall be 4'0" wide by 6'0" high or have a frame and integral sash perimeter equal thereto.

2.2.5 DRAWINGS and INSTALLATION DETAILS

Shop drawings shall be submitted, in triplicate, for approval. Drawings will show elevations of windows, full-size sections of sash and frames, details of construction, hardware and methods of anchoring window frame in the opening.

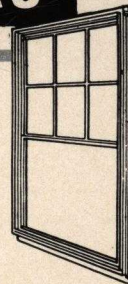
2.2.6 GLAZING

If bead glazed windows are specified, provision shall be made for the glass to be held in place by aluminum glazing beads, neatly fitted and securely attached to the sash members, and so designed that the glass may be bedded in glazing compound on both sides of the glass.

The following members of the Association manufacture a DH-A2 type window which has been tested and found to meet the requirements of this specification as of September 1, 1956. Up-to-date information on additional members qualifying under this specification may be obtained by writing to the Association office.

Ceco Steel Products Corporation, 5601 West 26th St., Chicago 50, Ill. (Series 200B)
Luria Building Products, Inc., P.O. Box 27, Bristol, Pa. (Series 100)
J. S. Thorn Company, 8501 Hegerman St., Philadelphia 36, Pa. (Series A5000)
Windalume Corporation, Route 46, Kenvil, N. J. (Series 200)

DOUBLE-HUNG (and SINGLE- and TRIPLE-HUNG) WINDOWS FOR MONUMENTAL-TYPE BUILDINGS

SPECIFICATION
DH-A3

(Section 1 in its entirety is a part of this specification.)

2.3.1 MATERIALS

Main frame and sash members (excluding sills) shall not be less than 0.062" in thickness. Sill members not reinforced by sub-frames or by proper stiffening ribs shall not be less than 0.094" in thickness. *(Accepted commercial tolerances).*

2.3.2 CONSTRUCTION

2.3.2.1 Cut-outs to give access to the sash balances shall be neat and closely fitted. Meeting rails of sliding sash shall contact tightly with each other or with weatherstrips and with wedge blocks at jambs when closed.

2.3.2.2 Where Single-Hung or Triple-Hung windows are specified they shall meet all provisions applying to Double-hung windows, except that one sash and three sash respectively shall be required to operate.

2.3.3 HARDWARE

2.3.3.1 The lower sash shall have two grips or bar lifts attached to the lower rail or shall have a continuous lift, except that for sash less than 3'0" wide between stops one grip or bar lift will be required.

2.3.3.2 Where specified, the upper sash shall have two pull handles at the underside of its meeting rail, except that for sash less than 3'0" wide between stops one pull handle will be required.

2.3.3.3 Where meeting rails are over 6 feet above the finished floor, pull handles shall be omitted and the upper sash shall be provided with a pull-down socket at the inner side of its top rail for pole operation.

2.3.3.4 Unless otherwise specified, holes for shade brackets shall be omitted. If shade brackets are specified, provision for them shall be made on all windows by two clear holes, to receive self-tapping screws, spaced 1¼ inches on center and located in the upper corner of each window, as directed by the architect. Shade brackets will be furnished and installed under another contract.

2.3.3.5 Sash shall operate freely and be equipped with balancing mechanisms or other devices which will hold sash stationary at any open position. The mechanisms used shall be easily accessible. Balances shall be installed in the plant of the manufacturer.

2.3.3.6 Unless otherwise specified, provision for window cleaner anchors shall be omitted. If window cleaner anchors are specified to be secured to the window frame, the frame shall be reinforced as may be required to receive the window cleaner anchors, and the window frames shall be anchored securely to the wall construction at point of application of the window cleaner bolts.

2.3.4 PERFORMANCE REQUIREMENTS

2.3.4.1 Physical Load Tests

NOTE: *Sample submitted for Physical Load Tests shall be of manufacturer's largest standard size, of standard construction, and at least 5'6" wide by 10'0" high.*

A.—Horizontal Load Test. A concentrated load of 40 pounds, acting horizontally and applied at the center of the span of any horizontal sash rail, shall not cause, before the sash are glazed, a horizontal deflection of more than 1/175 of its span and in no case shall the deflection exceed .312 inches.

B.—Vertical Load Test. A concentrated load of 40 pounds, acting vertically and applied at the center of the span of any horizontal sash rail, shall not cause, before the sash are glazed, a vertical deflection of more than 1/375 of its span and in no case shall the deflection exceed .188 inches.

C.—Uniform Load Test. Under a minimum exterior uniform load of 15 pounds per square foot, no member in a completely assembled window without muntins, glazed, closed and locked, continuously supported around its outside perimeter and securely anchored, shall deflect more than 1/175 of its span.

NOTE: *The span length of any horizontal sash member shall be considered as equal to the overall width of the sash provided for that size of window.*

2.3.4.2 Air Infiltration Test

When tested in accordance with the procedure as outlined in Section 1 under AIR INFILTRATION, the air infiltration shall not exceed 1/2 cubic foot per minute per foot of crack length with sash in closed position and locked. The sash shall have been adjusted to operate in either direction with a force not exceeding 45 pounds after the sash is in motion. The nominal size of the window tested shall

be 4'0" wide by 6'0" high or have a frame and integral sash perimeter equal thereto.

2.3.5 DRAWINGS and INSTALLATION DETAILS

Shop drawings shall be submitted in triplicate, for approval. Drawings shall show elevations of windows, full-size sections of sash and frames, details of construction, hardware and methods of anchoring window frame in the opening.

2.3.6 GLAZING

If bead glazed windows are specified, provision shall be made for the glass to be held in place by aluminum glazing beads, neatly fitted and securely attached to the sash members, and so constructed that the glass may be bedded in glazing compound on both sides of the glass.

The following members of the Association manufacture a DH-A3 type window which has been tested and found to meet the requirements of this specification as of September 1, 1956. Up-to-date information on additional members qualifying under this specification may be obtained by writing to the Association office.

Ceco Steel Products Corporation, 5601 West 26th St., Chicago 50, Ill. (Series 200B)
J. S. Thorn Company, 8501 Hegerman St., Philadelphia 36, Pa. (Series A5000)
Windalume Corporation, Route 46, Kenvil, N. J. (Series 300, 350)

SPECIFICATION **C-A1**

CASEMENT WINDOWS FOR RESIDENTIAL-TYPE BUILDINGS

(Section 1 in its entirety is a part of this specification.)

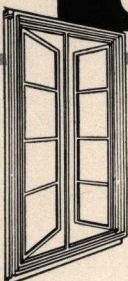
2.4.1 MATERIALS

Main frame and sash members shall not be less than 0.062" in thickness. Detached hardware and hinges having component parts which are exposed shall be aluminum, non-magnetic stainless steel or other non-corrosive materials which are compatible with aluminum and of sufficient strength to perform the functions for which they are used. Plated or coated materials not compatible with aluminum are

not permitted unless properly insulated from the aluminum (*Accepted commercial tolerances*).

2.4.2 HARDWARE

Satisfactory hardware shall be provided to control and securely lock the operating units. Extension hinges, locking handles and roto-type operators shall be furnished unless otherwise specified.



2.4.3 PERFORMANCE REQUIREMENTS

2.4.3.1 Physical Load Tests

NOTE: *Sample submitted for Physical Load Tests shall be of standard construction containing outswinging ventilators of manufacturer's largest standard size and at least 5'9" x 5'3".*

A.—Vertical Deflection Test of completely assembled window, ventilator without muntins, unglazed, with manufacturer's standard hardware. A concentrated load of 45 pounds, acting at the lower unrestrained corner of a ventilator opened 90° shall not cause a vertical deflection at the lower unrestrained corner greater than 1/2 inches, and at the conclusion of the test the ventilator shall properly close and operate.

NOTE: *Load of 45 pounds arbitrarily chosen to establish this standard test.*

B.—Horizontal Deflection Test on ventilator installed in window frame, without muntins, unglazed, locking hardware in approximate center of ventilator side rail in locked position. A concentrated load of 20 pounds acting at either of the unrestrained corners of a ventilator shall not cause a deflection at the unrestrained corners greater than 3/8 inches, and at the conclusion of the test the ventilator shall properly close and operate.

NOTE: *Load of 20 pounds arbitrarily chosen to establish this standard test.*

C.—Hardware Load Test on ventilators with hinges and roto-operating hardware. Standard window having two ventilators of manufacturer's largest standard size shall be securely fastened in the vertical plane so that when both ventilators are opened to their fullest extent they will be horizontal. The hardware shall be strong enough to support a uniform load equivalent to a wind velocity of 45 miles per hour, and at the conclusion of the test the operators shall function in such a manner as to satis-

factorily close and weather the ventilators. There shall be no failure of screws, track or permanent deformation of arm.

D.—Uniform Load Test on single and multiple window openings, glazed, closed and locked, supported continuously around outside perimeter and securely anchored. When subjected to an exterior uniform load of 10 pounds per square foot:

- a. No member in a single window unit, including those consisting of a combination of vents, fixed side lights and/or transoms, shall deflect more than 1/175 of its span. Window tested shall be manufacturer's largest standard size.
- b. No member, including horizontal and vertical mullions connecting single window units into multiple openings, shall deflect more than 1/175 of its span. All members in single units so combined must meet test described in paragraph (a) immediately above.

2.4.3.2 Air Infiltration Test

When tested in accordance with the procedure as outlined in Section 1 under AIR INFILTRATION, the air infiltration shall not exceed (A) in non-weatherstripped windows—one cubic foot; (B) in weatherstripped windows—1/2 cubic foot—per minute per foot of crack length with ventilator in closed position and locked. The window tested shall be of a nominal size of 3'0" x 4'0" and shall have two ventilators, each being of a nominal size of 1'6" x 4'0". In weatherstripped windows, ventilators shall be equipped with metal or other approved-type weatherstripping.

2.4.4 HOPPER AND TRANSOM VENTILATORS

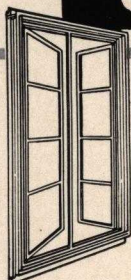
When used in combination with side-hinged ventilators as covered by this specification, hopper and/or transom ventilators shall be correlated with the provisions of Specification P-A1.

The following members of the Association manufacture a C-A1 type window which has been tested and found to meet the requirements of this specification as of September 1, 1956. Up-to-date information on additional members qualifying under this specification may be obtained by writing to the Association office.

Alcasco Products, Div. Detroit Gasket & Mfg. Co., 12640 Burt Rd., Detroit 23, Mich. (Series C-9)
Ceco Steel Products Corporation, 5601 West 26th St., Chicago 50, Ill. (Series 800)
Duralite Window Corporation, Carr St. & Southern Ry., Knoxville, Tenn.
Michael Flynn Mfg. Co., 700 East Godfrey Ave., Philadelphia 24, Pa. (Lupton RC)
Reynolds Metals Co. (Window Division), 2000 S. 9th St., Louisville, Ky. (Series 3000)
J. S. Thorn Co., 8501 Hegerman St., Philadelphia 36, Pa. (Series A-100, A-104, A-105)
Universal Window Company, 950 Parker St., Berkeley 10, Calif. (Series C-100)
Ware Laboratories, Inc., 3700 N.W. 25th St., Miami, Fla.

SPECIFICATION
C-A2

**CASEMENT WINDOWS
FOR COMMERCIAL-TYPE BUILDINGS**



(Section 1 in its entirety is a part of this specification.)

2.5.1 MATERIALS

Main frame and sash members shall not be less than 0.062" in thickness. Detached hardware, including hinges or sliding shoes, having component parts which are exposed, shall be of aluminum, non-magnetic stainless steel or other non-corrosive materials which are compatible with aluminum and of sufficient strength to perform the functions for which they are used. Bronze hardware may be used provided that it have a heavy deposit of chrome plate and is properly insulated from direct contact with the aluminum (*Accepted commercial tolerances*).

2.5.2 HARDWARE

Satisfactory hardware shall be provided to control and securely lock the ventilators. Extension hinges or sliding-type pivots, locking handles and roto-type operators shall be furnished unless otherwise specified.

2.5.3 PERFORMANCE REQUIREMENTS

2.5.3.1 Physical Load Tests

NOTE: *Samples submitted for Physical Load Test shall be of standard construction containing outswinging ventilators of manufacturer's largest standard size and at least 5'0" x 6'9".*

A.—Vertical Deflection Test of completely assembled window, ventilator without muntins, unglazed, with manufacturer's standard hardware. A concentrated load of 60 pounds, acting at the lower unrestrained corner of a ventilator opened 90° shall not cause a vertical deflection at the lower unrestrained corner greater than 5/16 inches, and at the conclusion of the test the ventilator shall properly close and operate.

NOTE: *Load of 60 pounds arbitrarily chosen to establish this standard test.*

B.—Horizontal Deflection Test on ven-

tilator installed in window frame, without muntins, unglazed, locking hardware in approximate center of ventilator side rail in locked position. A concentrated load of 20 pounds acting at either of the unrestrained corners of a ventilator shall not cause a deflection at the unrestrained corners greater than 5/16 inches, and at the conclusion of the test the ventilator shall properly close and operate.

NOTE: *Load of 20 pounds arbitrarily chosen to establish this standard test.*

C.—Hardware Load Test on ventilator with hinges and roto-operating hardware. Standard window having two ventilators of manufacturer's largest standard size shall be securely fastened in the vertical plane so that when both ventilators are opened to their fullest extent they will be horizontal. The hardware shall be strong enough to support a uniform load equivalent to a wind velocity of 50 miles per hour, and at the conclusion of the test the operators shall function in such a manner as to satisfactorily close and weather the ventilators. There shall be no failure of screws, track or permanent deformation of arm.

D.—Uniform Load Test on unit consisting of frame and pair of ventilating sash, glazed, closed and locked and for fixed units. This unit which shall be manufacturer's largest standard size, is to be continuously supported around the outside perimeter and securely anchored. When subjected to a minimum exterior uniform load of 15 pounds per square foot, no member in this unit shall deflect more than 1/175 of its span.

NOTE: *Due to the great variation of design and arrangements of ventilating units required by windows of this type and class, this uniform load test cannot be performed except on a standard unit such as that specified above. In order to insure uniformity of strength of all members required in any type of multiple unit opening, the manu-*

Approved WINDOWS

casement

17A
Alu

facturer shall guarantee the use of a design for mullions, transom bars and other connecting members that will not permit a deflection greater than 1/175 of the span of any member under conditions simulating the load test described immediately above.

2.5.3.2 Air Infiltration Test

When tested in accordance with the procedure as outlined in Section 1 under AIR INFILTRATION, the air infiltration shall not exceed (A) in non-weatherstripped windows—one cubic foot; (B) in weatherstripped windows— $\frac{1}{2}$ cubic foot—per minute per foot of crack length with ventilator in closed position and locked. The window tested shall be of a

nominal size of 4'0" x 6'0" and shall have two ventilators, each being of a nominal size of 2'0" x 6'0". In weatherstripped windows, ventilators shall be equipped with metal or other approved-type weatherstripping.

2.5.4 HOPPER AND TRANSOM VENTILATORS

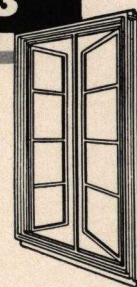
When used in combination with side-hinged ventilators as covered by this specification, hopper and/or transom ventilators shall be correlated with the provisions of Specification P-A2.

The following members of the Association manufacture a C-A2 type window which has been tested and found to meet the requirements of this specification as of September 1, 1956. Up-to-date information on additional members qualifying under this specification may be obtained by writing to the Association office.

Michael Flynn Mfg. Co., 700 East Godfrey Ave., Philadelphia 24, Pa. (Lupton MC)
J. S. Thorn Co., 8501 Hegerman St., Philadelphia 36, Pa. (Series A-175P, A-175C)

CASEMENT WINDOWS FOR MONUMENTAL-TYPE BUILDINGS

SPECIFICATION
C-A3



(Section 1 in its entirety is a part of this specification.)

NOTE: For C-A3 specifications use C-A2 specification in its entirety and add the following paragraph under 2.5.3.1-D.

E.—Torsion Test on ventilator, without muntins, unglazed, supported on fulcrums, at diagonally opposite corners, with the corner diagonally opposite the loaded corner secured in the same plane by fulcrum support block and clamp. A concentrated

load of 20 pounds acting at the unrestrained corner of the ventilator shall not cause a deflection at the unrestrained corner greater than $1\frac{1}{2}$ ".

NOTE: Load of 20 pounds arbitrarily chosen to establish this standard test.

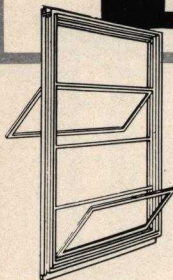
NOTE: Sample window submitted for Physical Load Test under specification C-A3 should be of manufacturer's largest standard size and at least 6'9" x 8'0".

SPECIFICATION

P-A1

PROJECTED WINDOWS FOR RESIDENTIAL-TYPE BUILDINGS

(Section 1 in its entirety is a part of this specification.)



2.7.1 MATERIALS

Main frame and sash members shall not be less than 0.062" in thickness. Detached hardware and sliding shoes having component parts which are exposed shall be aluminum, non-magnetic stainless steel, or other non-corrosive materials which are compatible with aluminum and of sufficient strength to perform the functions for which they are used. Bronze hardware may be used provided that it have a heavy deposit of chrome plate and is properly insulated from direct contact with the aluminum *(Accepted commercial tolerances)*.

2.7.2 HARDWARE

Satisfactory hardware shall be provided to control and securely lock the ventilators. Ventilators shall have balance arms to position the ventilator with built-in sliding friction pivots having springs and non-abrasive shoes. Detached hardware shall consist of locking handle for manual operation as standard or spring catch for pole operation where required.

2.7.3 PERFORMANCE REQUIREMENTS

2.7.3.1 Physical Load Tests

NOTE: *Sample submitted for Physical Load Tests shall be of standard construction containing projected-out ventilator of manufacturer's largest standard size and at least 4'0" x 5'9".*

A.—Hardware Load Test on unglazed window with projected-out ventilator open to 45°,

securely clamped and continuously supported around the outside perimeter, one free corner of the open ventilator securely held in the 45° position by blocking between the corner of the ventilator and the fixed portion of the window. A concentrated load of 17 pounds acting from the outside, perpendicular to the plane of the fixed portion and applied to the free rail of the ventilator at the point of locking handle attachment, shall not cause a deflection at the free corner opposite the blocked corner, measured perpendicular to plane of the fixed portion, greater than 3 1/2".

B.—Uniform Load Test on complete unit.

A glazed window with ventilator closed and locked shall be continuously supported around the outside perimeter and securely anchored. When subjected to an exterior uniform load of 10 pounds per square foot, applied perpendicular to and on the surface corresponding to the outside of the window, no member of a window unit or vertical or horizontal mullions, shall deflect more than 1/175 of its span.

2.7.3.2 Air Infiltration Test

When tested in accordance with the procedure as outlined in Section 1 under AIR INFILTRATION, the air infiltration shall not exceed (A) in non-weatherstripped windows — one cubic foot; (B) in weatherstripped windows 1/2 cubic foot—per minute per foot of crack length with ventilator in closed position and locked. The nominal size of the ventilators of the window tested shall be approximately 3'0" wide by 2'0" high. In weatherstripped windows, ventilators shall be equipped with metal or other approved-type weatherstripping.

The following members of the Association manufacture a P-A1 type window which has been tested and found to meet the requirements of this specification as of September 1, 1956. Up-to-date information on additional members qualifying under this specification may be obtained by writing to the Association office.

Alcasco Products, Div. Detroit Gasket & Mfg. Co., 12640 Burt Rd., Detroit 23, Mich. (Series P100)
Ceco Steel Products Corporation, 5601 West 26th St., Chicago 50, Ill. (Series 500)
Michael Flynn Mfg. Co., 700 East Godfrey Ave., Philadelphia 24, Pa. (Lupton MP)
J. S. Thorn Company, 8501 Hegerman St., Philadelphia 36, Pa. (Series A-175P)
Universal Window Company, 950 Parker St., Berkeley 10, Calif. (Series S-300)
Ware Laboratories, Inc., 3700 N.W. 25th St., Miami, Fla.
Windalume Corporation, Route 46, Kenvil, N. J. (Series 500)

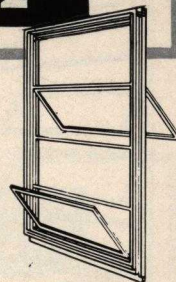
Approved WINDOWS

projected

17A
Alu

PROJECTED WINDOWS FOR COMMERCIAL- and MONUMENTAL-TYPE BUILDINGS

SPECIFICATION
P-A2



(Section 1 in its entirety is a part of this specification.)

2.8.1 MATERIALS

Main frame and sash members shall not be less than 0.062" in thickness. Detached hardware and sliding shoes having component parts which are exposed shall be aluminum, non-magnetic stainless steel, or other non-corrosive materials which are compatible with aluminum and of sufficient strength to perform the functions for which they are used. Bronze hardware may be used provided that it have a heavy deposit of chrome plate and is properly insulated from direct contact with the aluminum (*Accepted commercial tolerances*).

2.8.2 HARDWARE

Satisfactory hardware shall be provided to control and securely lock the ventilators. Ventilators shall have balance arms to position the ventilator with built-in sliding friction pivots having springs and non-abrasive shoes. Detached hardware shall consist of one locking handle for manual operation as standard or spring catch for pole operation where required.

2.8.3 PERFORMANCE REQUIREMENTS

2.8.3.1 Physical Load Tests

NOTE: *Samples submitted for Physical Load Test shall be of standard construction containing projected-out ventilator of manufacturer's largest standard size and at least 4'0" x 8'0".*

A.—Torsion Load Test on unglazed window with projected-out ventilator open to 45°, securely clamped and continuously supported around

the outside perimeter, one free corner of the open ventilator securely held in the 45° position by blocking between the corner of the ventilator and the fixed portion of the window. A concentrated load of 30 pounds acting from the outside, perpendicular to the plane of the fixed portion and applied to the free rail of the ventilator at the point of locking handle attachment, shall not cause a deflection at the free corner opposite the blocked corner, measured perpendicular to plane of fixed portion, greater than 3 1/2". The ventilators must open and close freely before and after the test when applying an operational force of not more than 15 pounds.

B.—Uniform Load Test on complete unit.

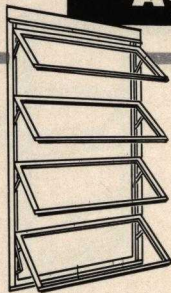
A glazed window with ventilator closed and locked shall be continuously supported around the outside perimeter and securely anchored. When subjected to an exterior uniform load of 15 pounds per square foot, applied perpendicular to and on the surface corresponding to the outside of the window, no member of a window unit or vertical or horizontal mullions, shall deflect more than 1/175 of its span.

2.8.3.2 Air Infiltration Test

When tested in accordance with the procedure as outlined in Section 1 under AIR INFILTRATION, the air infiltration shall not exceed (A) in non-weatherstripped windows — one cubic foot; (B) in weatherstripped windows 1/2 cubic foot — per minute per foot of crack length with ventilator in closed position and locked. The nominal size of the ventilators of the window tested shall be approximately 4'0" wide by 2'8" high. In weatherstripped windows, ventilators shall be equipped with metal or other approved-type weatherstripping.

The following members of the Association manufacture a P-A2 type window which has been tested and found to meet the requirements of this specification as of September 1, 1956. Up-to-date information on additional members qualifying under this specification may be obtained by writing to the Association office.

Alcasco Products, Div. Detroit Gasket & Mfg. Co., 12640 Burt Rd., Detroit 23, Mich. (Series P100)
The William Bayley Company, 1200 Warder St., Springfield 99, Ohio
Ceco Steel Products Corporation, 5601 West 26th St., Chicago 50, Ill. (Series 500)
Michael Flynn Mfg. Co., 700 East Godfrey Ave., Philadelphia 24, Pa. (Lupton MP)
J. S. Thorn Company, 8501 Hegerman St., Philadelphia 36, Pa. (Series A-175P)
Universal Window Company, 950 Parker St., Berkeley 10, Calif. (Series S-300)
Ware Laboratories, Inc., 3700 N.W. 25th St., Miami, Fla.
Windalume Corporation, Route 46, Kenil, N. J. (Series 500)

SPECIFICATION
A-A1AWNING WINDOWS
FOR RESIDENTIAL-TYPE BUILDINGS*(Section 1 in its entirety is a part of this specification.)*

2.9.1 GENERAL

Awning windows are those windows consisting of a multiplicity of top-hinged ventilators arranged in a vertical series and operated by one or more control devices which swing the bottom edges of the ventilators outward. The hinges may be sliding or fixed. The ventilators may be operated simultaneously, in sequence or individually. The ventilators may close and weather on themselves or on independent meeting rails assembled as part of the window frame. There may or may not be fixed glass units between the ventilators.

2.9.2 MATERIALS

Main frame and sash members shall not be less than 0.062" in thickness. Detached hardware and sliding shoes having component parts which are exposed shall be aluminum, non-magnetic stainless steel, or other non-corrosive materials which are compatible with aluminum and of sufficient strength to perform the functions for which they are used. Bronze hardware may be used provided that it have a heavy deposit of chrome plate and is properly insulated from direct contact with the aluminum (*Accepted commercial tolerances*).

2.9.3 HARDWARE

Satisfactory hardware shall be provided to control and securely lock the ventilators. Detached hardware shall consist of roto-type operator for crank type operation or locking handle for manual operation of ventilators in unison or sequence, or push bars for manual, individual operation of ventilators.

2.9.4 PERFORMANCE
REQUIREMENTS

2.9.4.1 Physical Load Tests

NOTE: *Sample window submitted for Physical Load Tests shall be of standard construction of manufacturer's largest standard size containing maximum number of largest standard size ventilators and at least 3'0" x 5'3".*

A.—Horizontal Deflection Test on ventilators installed in window frame, closed and locked, without muntins, unglazed. A concentrated load of 20 pounds acting individually on each lower corner of all ventilators shall not cause a deflection at the corner greater than $\frac{3}{8}$ inches, and at the conclusion of the test the ventilators shall properly close and operate.

NOTE: *Load of 20 pounds arbitrarily chosen to establish this standard test.*

B. — Hardware Load Test on Roto Operated Ventilators. Standard window having ventilators of manufacturer's largest standard size shall be securely mounted in such a position that when the ventilators are opened to their fullest extent they will be horizontal. The hardware shall be strong enough to support a uniform load equivalent to a wind velocity of 50 miles per hour, and at the conclusion of the tests the operators shall function in such a manner as to satisfactorily close and weather the ventilators. There shall be no failures of screws, hardware parts, track or permanent deformation of arms allowed.

Hardware Load Test on Friction-type Ventilators. Standard window, having ventilators of manufacturer's largest standard size, shall be securely mounted in such a position that when ventilators are opened to their fullest extent they will be horizontal. One corner of the bottom ventilator securely held in the fully-open position by blocking between the corner of the ventilator and the fixed portion of the window. The hardware shall be strong enough to support a uniform load equivalent to a wind velocity of 50 miles per hour, and at the conclusion of the test shall function in such a manner as to satisfactorily close and weather the ventilators. There shall be no failure of screws, hardware parts, track or permanent deformation of arms allowed.

C.—Uniform Load Test on complete unit. A glazed window with ventilators closed and locked shall be continuously supported around the outside perimeter and securely anchored. When subjected to an exterior uniform load of 10 pounds per square foot, applied perpendicular to and on the surface corresponding to the outside of the window, no member of a window unit or vertical or horizontal mullions, shall deflect more than 1/175 of its span.

2.9.4.2 Air Infiltration Test

When tested in accordance with the procedure as outlined in Section 1 under AIR INFILTRATION, the air infiltration shall not exceed (A) in non-weatherstripped windows—one cubic foot; (B) in weatherstripped windows— $\frac{1}{2}$ cubic foot—per minute per foot of crack length with ventilators in closed position and locked. The window tested shall be of a nominal size of 3'0" wide x 4'0" high and shall be 100% ventilated, using manufacturer's standard ventilator arrangement. In weatherstripped windows, ventilators shall be equipped with metal or other approved-type weatherstripping.

Approved WINDOWS

awning

17A
Alu

The following members of the Association manufacture an A-A1 type window which has been tested and found to meet the requirements of this specification as of September 1, 1956. Up-to-date information on additional members qualifying under this specification may be obtained by writing to the Association office.

Reynolds Metals Co. (Window Division), 2000 S. 9th St., Louisville, Ky. (Series 4000, 5000)

Universal Window Company, 950 Parker St., Berkeley 10, Calif. (Series M-200)

Ware Laboratories, Inc., 3700 N.W. 25th St., Miami, Fla. (Ware Awning)

AWNING WINDOWS FOR COMMERCIAL- AND MONUMENTAL-TYPE BUILDINGS

SPECIFICATION
A-A2

(Section 1 in its entirety is a part of this specification.)

2.10.1 GENERAL

Awning windows are those windows consisting of a multiplicity of top-hinged ventilators arranged in vertical series and operated by one or more control devices which swing the bottom edges of the ventilators outward. The hinges may be sliding or fixed. The ventilators may be operated simultaneously, in sequence or individually. The ventilators may close and weather on themselves or on independent meeting rails assembled as part of the window frame. There may or may not be fixed glass units between the ventilators.

2.10.2 MATERIALS

Main frame and sash members shall not be less than 0.062" in thickness. Detached hardware and sliding shoes having component parts which are exposed shall be aluminum, non-magnetic stainless steel, or other non-corrosive materials which are compatible with aluminum and of sufficient strength to perform the functions for which they are used. Bronze hardware may be used provided that it have a heavy deposit of chrome plate and is properly insulated from direct contact with the aluminum (*Accepted commercial tolerances*).

2.10.3 HARDWARE

Satisfactory hardware shall be provided to control and securely lock the ventilators. Detached hardware shall consist of roto-type operator for crank type operation or locking handle for manual operation of ventilators in unison or sequence, or push bars for manual, individual operation of ventilators.

2.10.4 PERFORMANCE REQUIREMENTS

2.10.4.1 Physical Load Tests

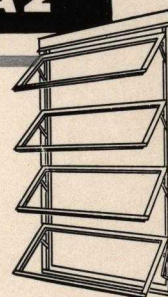
NOTE: *Sample windows submitted for Physical Load Tests shall be of standard construction of manufacturer's largest standard size containing maximum number of largest standard size ventilators and at least 4'0" x 8'0".*

A.—Horizontal Deflection Test on ventilators installed in window frame, closed and locked, without muntins, unglazed. A concentrated load of 20 pounds acting individually on each lower corner of all ventilators shall not cause a deflection at the corner greater than 5/16 inches, and at the conclusion of the test the ventilator shall properly close and operate.

NOTE: *Load of 20 pounds arbitrarily chosen to establish this standard test.*

B. — Hardware Load Test on Roto Operated Ventilators. Standard window having ventilators of manufacturer's largest standard size shall be securely mounted in such a position that when the ventilators are opened to their fullest extent they will be horizontal. The hardware shall be strong enough to support a uniform load equivalent to a wind velocity of 50 miles per hour, and at the conclusion of the tests the operators shall function in such a manner as to satisfactorily close and weather the ventilators. There shall be no failures of screws, hardware parts, track or permanent deformation of arms allowed.

Hardware Load Test on Friction-type Ventilators. Standard window, having ventilators of manufacturer's largest standard size, shall be securely mounted in such a position that when ventilators are opened to their fullest extent they will be horizontal. One corner of the bottom ventilator securely held in the fully-open position by blocking between the corner of the ventilator and the fixed portion of the window. The hardware shall be strong enough to support a uniform load equivalent to a wind velocity of 50 miles per hour, and at the conclusion of the test shall function in such a manner as to satisfactorily close and weather the ventilators. There shall be no failure of screws, hardware parts, track or permanent deformation of arms allowed.



C.—Uniform Load Test on complete unit.

A glazed window with ventilators closed and locked shall be continuously supported around the outside perimeter and securely anchored. When subjected to an exterior uniform load of 15 pounds per square foot, applied perpendicular to and on the surface corresponding to the outside of the window, no member of a window unit or vertical or horizontal mullions, shall deflect more than 1/175 of its span.

NOTE: Due to the great variation of design and arrangements of ventilating units required by windows of this type and class, this uniform load test cannot be performed except on a standard unit such as that specified above. In order to insure uniformity of strength of all members required in any type of multiple unit opening, the manufacturer shall guarantee the use of a design for mullions, transom bars and other con-

necting members that will not permit a deflection greater than 1/175 of the span of any member under conditions simulating the load test described immediately above.

2.10.4.2 Air Infiltration Test

When tested in accordance with the procedure as outlined in Section 1 under AIR INFILTRATION, the air infiltration shall not exceed (A) in non-weatherstripped windows—one cubic foot; (B) in weatherstripped windows—1/2 cubic foot—per minute per foot of crack length with ventilators in closed position and locked. The window tested shall be of a nominal size of 4'0" wide x 5'6" high and shall be 100% ventilated, using manufacturer's standard ventilator arrangement. In weatherstripped windows, ventilators shall be equipped with metal or other approved-type weatherstripping.

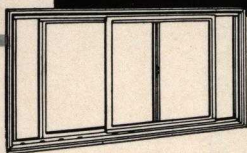
The following members of the Association manufacture an A-A2 type window which has been tested and found to meet the requirements of this specification as of September 1, 1956. Up-to-date information on additional members qualifying under this specification may be obtained by writing to the Association office.

Universal Window Company, 950 Parker St., Berkeley 10, Calif. (Series M-200)

Ware Laboratories, Inc., 3700 N.W. 25th St., Miami, Fla. (Ware Awning, Ware Rite, Ware Monumental Awning)

SPECIFICATION

DS-A1



DOUBLE-SLIDING (and SINGLE-SLIDING) WINDOWS FOR RESIDENTIAL-TYPE BUILDINGS

(Section 1 in its entirety is a part of this specification)

2.11.1 MATERIALS

Main frame and sash members shall not be less than 0.062" in thickness (*Accepted commercial tolerances*).

2.11.2 CONSTRUCTION

2.11.2.1 Frames and/or sash units shall be completely assembled at the plant of the manufacturer or by duly authorized representatives.

2.11.2.2 Frames shall be constructed to permit horizontal movement of sash. Meeting stiles shall contact tightly with each other or with weatherstrips. Sash shall not be removable from the outside when locked.

2.11.2.3 Provision shall be made in sill for exterior drainage of water.

2.11.2.4 Where Single-Slide windows or Multiple-Slide windows with fixed lights are specified, they shall meet all provisions applying to Double-Slide as herein specified.

2.11.3 HARDWARE

The windows shall be equipped with locks and pulls of suitable non-ferrous or non-magnetic stainless steel materials. Sash shall operate freely.

2.11.4 PERFORMANCE REQUIREMENTS

2.11.4.1 Physical Load Tests

CLASS I SLIDING WINDOWS

(This class includes sliding windows having a height not exceeding 2'6" and a total window area not exceeding 9 square feet.)

NOTE: Sample submitted for Physical Load Tests shall be of manufacturer's largest standard size, of standard construction, and at least 4'0" wide by 2'0" high.

A. — Horizontal Load Test perpendicular to plane of window. A concentrated load of

Approved WINDOWS

sliding

17A
Alu

10 pounds, acting horizontally and applied at the center of the span of any vertical sash stile assembled in the sash, shall not cause, before the sash are glazed, a horizontal deflection of more than $1/165$ of its span and in no case shall the deflection exceed .145 inches.

B. — Horizontal Load Test parallel to plane of window. A concentrated load of 10 pounds, acting horizontally and applied at the center of the span of any vertical sash stile assembled in the sash, shall not cause, before the sash are glazed, a horizontal deflection of more than $1/160$ of its span and in no case shall the deflection exceed .150 inches.

C.—Uniform Load Test. Under an exterior uniform load of 10 pounds per square foot no member in completely assembled windows without muntins, glazed, closed and locked, continuously supported around its outside perimeter and securely anchored, shall deflect more than $1/175$ of its span.

NOTE: *The span length of any vertical sash member shall be considered as equal to the overall height of the sash provided for that size of window.*

CLASS II SLIDING WINDOWS

(This class includes sliding windows having a height and/or total window area exceeding the Class I limits.)

NOTE: *Sample submitted of Physical Load Tests shall be of manufacturer's largest standard size, of standard construction, and at least 4'6" wide by 3'6" high.*

A. — Horizontal Load Test perpendicular to plane of window. A concentrated load of 10 pounds, acting horizontally and applied at the center of the span of any vertical sash stile assembled in the sash, shall not cause, before the sash are glazed, a horizontal deflection of more than $1/175$ of its span and in no case shall the deflection exceed .240 inches.

B. — Horizontal Load Test parallel to plane of window. A concentrated load of 10 pounds, acting horizontally and applied at the center of the span of any vertical sash stile assembled in the

sash, shall not cause, before the sash are glazed, a horizontal deflection of more than $1/175$ of its span and in no case shall the deflection exceed .240 inches.

C.—Uniform Load Test. Under an exterior uniform load of 10 pounds per square foot no member in completely assembled window without muntins, glazed, closed and locked, continuously supported around its outside perimeter and securely anchored, shall deflect more than $1/175$ of its span.

NOTE: *The span length of any vertical sash member shall be considered as equal to the overall height of the sash provided for that size of window.*

2.11.4.2 Air Infiltration Test

When tested in accordance with the procedure as outlined in Section 1 under Air Infiltration, the air infiltration shall not exceed $3/4$ cubic foot per minute per foot of crack length with sash in closed position and locked. The sash shall have been adjusted to operate in either direction with a force not exceeding 10 pounds after the sash is in motion. The nominal size of the window tested shall be 4'0" wide by 2'0" high or have a frame and integral sash perimeter equal thereto for Class I Sliding Windows and 4'6" wide by 3'6" high or have a frame and integral sash perimeter equal thereto for Class II Sliding Windows.

2.11.4.3 Water Resistance Test

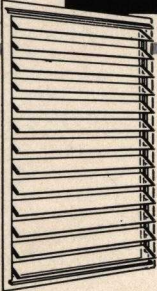
When subjected for a period of 15 minutes to dynamic testing conditions as established by the Aluminum Window Manufacturers Association, consisting of finely dispersed water drops injected into the airstream in such a manner as to apply to the exterior face of the window no less than 2" of water per hour per square foot of window area ($1\frac{1}{4}$ gallons per hour per square foot), no infiltrated water shall overflow on any part of the sill on the interior face of the window. The velocity of the airstream at the blade of the wind generator shall be 45 miles per hour, and the generator shall be located at a distance of 16 feet from the exterior side of the test window.

The following members of the Association manufacture a DS-A1 type window which has been tested and found to meet the requirements of this specification as of September 1, 1956. Up-to-date information on additional members qualifying under this specification may be obtained by writing to the Association office.

Ceco Steel Products Corporation, 5601 West 26th St., Chicago 50, Ill.
Luria Building Products, Inc., P.O. Box 27, Bristol, Pa. (Series 61)
Reynolds Metals Co. (Window Division), 2000 S. 9th St., Louisville, Ky. (Series 3200)
J. S. Thorn Company, 8501 Hegerman St., Philadelphia 36, Pa. (Series A-300)

SPECIFICATION
J-A1

**JALOUSIE WINDOWS
FOR RESIDENTIAL-TYPE BUILDINGS**



(Section 1 in its entirety is a part of this specification)

2.12.1 GENERAL

Jalousie windows are those windows consisting of a series of overlapping, horizontal glass louvers which pivot simultaneously in a common frame and are actuated by one or more operating devices so that the bottom edge of each louver swings toward the exterior and the top edge swings toward the interior during opening.

2.12.2 MATERIALS

Frame members, including heads, jambs and sills, shall be not less than 0.062" in thickness. Jamb members shall have a minimum thickness of 0.093" at the portions through which passes the pivoting device supporting the glass louvers. Pivot clips and actuating hardware shall be of aluminum. Pivot clips shall have a minimum thickness of 0.051". Operating hardware having component parts which are exposed shall be of aluminum, non-magnetic stainless steel or other non-corrosive materials which are compatible with aluminum and of sufficient strength to perform the functions for which they are intended. Plated or coated materials not compatible with aluminum are not permitted unless properly insulated from the aluminum.

2.12.3 CONSTRUCTION

2.12.3.1 Windows shall be completely assembled at the plant of the manufacturer or by duly authorized representatives.

2.12.3.2 Tolerances shall not exceed plus or minus 0.032" on window width and 0.062" on window height.

2.12.3.3 All frame members shall include a flange of sufficient width to overlap the bucks within the rough opening and permit back caulking.

2.12.4 HARDWARE

2.12.4.1 Pivot clips shall be provided to house the ends of the glass louvers and shall be balanced within reasonable limits. They shall be designed to securely hold the glass louvers under all normal operating conditions. The pivot clip shall be so constructed and applied to the jamb with free pivoting clearance that a galling or abrasive action will not occur between its surface and the pivot face of the jamb.

2.12.4.2 Satisfactory operating hardware of the roto, worm gear or rack-and-pinion type shall be provided to control and securely lock the louvers in any position from fully closed to fully open in which position the outer edges of the louvers shall be a minimum of 10° above horizontal. The operator shall be attached to the frame with bolts and nuts in such a location that the crank or knob will clear the face of the reveal as well as the screen.

2.12.5 PERFORMANCE REQUIREMENTS

2.12.5.1 Physical Load Tests

NOTE: Sample submitted for Physical Load Tests shall be manufacturer's largest standard size, of standard construction, provided with glass louvers in number, size and description as recommended by window manufacturer, and at least 3'0" wide by 4'0" high.

A.—Hardware Load Test on complete window, glazed and fully closed, securely mounted true, plumb, level and square in a rigid frame. All pivot clips and actuating and operating hardware shall be strong enough to support an exterior uniform load of 10 pounds per square foot, and at the conclusion of the test they shall function in such a manner as to satisfactorily open and close all louvers

properly with 7/16" minimum overlap when closed and without excessive strain on the actuating and operating hardware. There shall be no failure or permanent deformation of pivot pins or rivets or any component of the actuating or operating hardware allowed.

B.—Uniform Load Test on single and multiple window openings, glazed and fully closed, supported continuously around outside perimeter and securely anchored. When subjected to an exterior uniform load of 10 pounds per square foot:

- a. No Aluminum member in a single window unit shall deflect more than 1/175 of its span. There shall be no cracking or breaking of any glass member.
- b. No aluminum member, including horizontal and vertical mullions connecting single window units into multiple openings, shall deflect more than 1/175 of its span. All aluminum and glass members so combined must meet test described in paragraph (a) immediately above.

2.12.5.2 Air Infiltration Test

A.—Windows With Jamb Weatherstripping. When tested in accordance with the procedure as outlined in Section 1 under AIR INFILTRATION, the air infiltration shall not exceed one cubic foot per minute per square foot of projected clear glass area with louvers in fully-closed position. The window tested shall be of a nominal size of 3'0" wide by 4'0" high and shall be 100% ventilated with manufacturer's maximum number of louvers. Jamb shall

be equipped with metal or other approved-type weatherstripping.

B.—Windows Without Jamb Weatherstripping. When tested in accordance with the procedure as outlined in Section 1 under AIR INFILTRATION, the air infiltration shall not exceed 1-1/2 cubic feet per minute per square foot of projected clear glass area with louvers in fully-closed position. The window tested shall be of a nominal size of 3'0" wide by 4'0" high and shall be 100% ventilated with manufacturer's maximum number of louvers.

2.12.5.3 Water Resistance Test

When subjected for a period of 15 minutes to dynamic testing conditions as established by the Aluminum Window Manufacturers Association, consisting of finely dispersed water drops injected into the airstream in such a manner as to apply to the exterior face of the window no less than 2" of water per hour per square foot of window area (1 1/4 gallons per hour per square foot), no infiltrated water shall overflow on any part of the sill on the interior face of the window. The velocity of the airstream at the blade of the wind generator shall be at least 45 miles per hour, but in any case the mean dynamic pressure as indicated at any point on the exterior face of the window shall be no less than 5 pounds per square foot maintained throughout the test.

2.12.6 GLAZING

Windows shall be designed for glazing with glass having a minimum thickness of 7/32" with allowances provided for commercial tolerances.

The following members of the Association manufacture a J-Al type window which has been tested and found to meet the requirements of this specification as of September 1, 1956. Up-to-date information on additional members qualifying under this specification may be obtained by writing to the Association office.

Ware Laboratories, Inc., 3700 N.W. 25th St., Miami, Fla.

SPECIFICATION AND DESIGN CHECK LIST

GENERAL

1. The performance requirements included in the Master Specification were developed by the A.W.M.A. Technical Committee, for use by the entire aluminum window industry, after carrying out experimental tests and observing the performance of windows under actual installation conditions over a period of many years. These *performance* requirements were established in preference to specifically designated physical characteristics. To obtain the A.W.M.A. "Quality-Approved" Seal, the tests required by these performance requirements must be conducted by the independent Pittsburgh Testing Laboratory.
2. Some general factors which can assist in maintaining minimum cost are:
 - a) Stock designs in standard sizes.
 - b) Maximum use of one type and size of window throughout the building.
 - c) Uniform design of windows.
 - d) Only minor adjustments, at most, on a standard design recommended by the manufacturer.
3. Aluminum windows can be specified for any type of curtain wall. When standard windows are not suited for the required conditions, it is usually not difficult for a manufacturer to alter his fabrication processes to meet the specific design requirement.

MATERIALS

1. Sliding aluminum windows, either vertical (double-hung windows, for example) or horizontal, will give better service if all contact points between the sliding sash and frame are weatherstripped.
 2. Satisfactory weatherstripping should:
 - a) control air infiltration.
 - b) withstand external atmospheric conditions.
 - c) hold up mechanically under use.
 - d) resist galvanic action.
 - e) resist corrosion.
 - f) be easily replaceable.
 - g) keep dirt accumulation to a minimum.
 - h) be very durable in relation to sash material.
- Fabric pile, stainless steel, Monel metal, felt and plastic weatherstripping are often used to accomplish the above objectives.
3. In the case of projected, casement and awning windows, where hardware normally forces a tight closure and where no sliding action exists, metal-to-metal contact can be satisfactory without weatherstripping.

CONSTRUCTION

1. Aluminum alloys used in windows have a coefficient of thermal expansion of .000013 per inch, per degree F. (*Approximately 1/8" per 100° F change of temperature per 8' length.*) Aluminum windows must be designed and anchored so that they will not be distorted, nor the fasteners overstressed from the expansion and contraction of the metal.

2. Either mechanical joining or welding is satisfactory for aluminum windows when properly performed. If gas welding is chosen, it is important that the flux be removed after the welding process is completed; otherwise the residue may act as a corrosive substance. Shielded arc-welding and flash welding present no residue problem.
3. Sill member should never be of lighter gage than accompanying window frame as it will be subject to harder use.

PROTECTIVE COATINGS

1. Aluminum windows are actually a *finished* interior-exterior building product. To protect the finished surfaces against staining, discoloration, abrasion and other abuses during shipment and construction of building, all frame and sash members should be coated with a suitable, protective coating before shipment from the factory. The preferred coating is a clear, water-white methacrylate-type lacquer, resistant to alkaline mortar and plaster.
2. When necessary to remove protective coating, this should be removed after plastering is completed.

AIR INFILTRATION

The standard measure of air infiltration is in terms of cubic feet per minute per lineal foot of crack length when a window is adjusted for normal operation and subjected to a static pressure equal to the pressure exerted by wind at a velocity of 25 m.p.h. which will result in a force of 1,560 pounds per square foot. (Enswiler formula $P = .002496V^2$ where P = the pressure in pounds per sq. ft. on a flat surface normal to direction of wind and V = velocity of wind in miles per hour.)

DRAWINGS and INSTALLATION DETAILS

1. Dissimilar Materials:
 - a) Where aluminum surfaces come in contact with metals other than stainless steel, zinc, or white bronze of small area, keep aluminum surfaces from direct contact with incompatible metals by:
 1. painting the dissimilar metal with a prime coat of zinc-chromate primer or other suitable primer, followed by one or two coats of aluminum metal-and-masonry paint or other suitable protective coating, excluding those containing lead pigmentation.
 2. painting the dissimilar metal with a coating of a heavy-bodied bituminous paint.
 3. a good quality caulking material placed between the aluminum and the dissimilar metal.
 4. a non-absorptive tape or gasket. Steel anchors and connecting members may be hot-dip galvanized or zinc plated after fabrication.

Approved WINDOWS

b) Dissimilar metals should be painted if used in locations where drainage from them passes over aluminum.

c) Paint aluminum surfaces in contact with lime mortar, concrete or other masonry materials with alkali-resistant coatings, such as water-white methacrylate lacquer.

d) Wood or other absorptive materials which may become repeatedly wet, that are in contact with aluminum, should be painted with two coats of aluminum house paint and joints sealed with a good quality caulking compound.

e) Where aluminum is in contact with treated wood, wood shall be treated with pentachlorophenol, 5% minimum concentration, or Wolman Salts or creosote or zinc naphthanate (select one) and follow the protective measures outlined in paragraph (d).

2. Installation Factors: To insure proper anchorage these fundamentals should be kept in mind:

a) Anchorage must hold the window rigid.

b) Strong anchors for jambs of commercial windows as they must satisfy the needs of the window cleaner.

c) Windows must be supported securely at sill in order to withstand normal use of window cleaner.

d) Anchors should be manufactured and installed to obviate any staining on the aluminum surfaces.

e) All anchoring devices used in the erection of aluminum windows must be of aluminum, non-magnetic stainless steel, or other corrosion resistant materials compatible with aluminum. Steel anchors may be used provided that they are adequately protected as outlined under 1 (a) above.

f) Specify who will supply anchors—window manufacturer or erection contractor.

Each aluminum window manufacturer will normally show in his own literature the best method of anchoring his windows to surrounding construction; his representative should be consulted in the event that special design is used.

3. It is essential to cover and allow for proper workmanship and installation. Minimum requirements are that the work shall be made and erected

square, plumb, straight and true, designed for adjustment to field variations, accurately fitted with tight joints and intersections, adequately reinforced and anchored in place.

4. Shop drawings should be submitted for approval in duplicate if the window installation does not follow standard installation details.

ERECTION

Large assemblies made up of individual units in the factory are feasible only up to a certain point, because of the controlling factor of transportation; in such instances, assembly at the site provides a simple solution.

CAULKING and GLAZING

1. Mastic-type caulking compounds should be provided and installed by others except in the case of metal-to-metal contact points, which shall be provided and installed by the window erection contractor.

2. A mastic-type glazing compound that does not require painting should be specified. As aluminum-colored mastic alone is insufficient precaution, a compound should be labelled, without qualification, that it does *not* need painting. A glazing compound should remain elastic enough to perform properly when subjected to the rigors of atmospheric environments. Mastic-type compounds are advantageous, as they permit a broken light to be replaced easily, as opposed to those glazing materials which become hard and brittle. Glazing compound to be supplied and installed by the glazing contractor.

3. All glazing clips should be installed by glazing contractor. Standard type glazing clips provided by glazing contractor. Special type glazing clips provided by window manufacturer. Glazing clips for double insulating glass provided by glass manufacturer.

4. Aluminum windows can be prepared for either inside or outside glazing. Consult the individual window manufacturers to determine their respective glazing details.

USEFUL PUBLICATIONS FOR THE ARCHITECT, ENGINEER, DESIGNER, BUILDER AND CONTRACTOR

1. Simplified Instructions for the proper handling and installation of Aluminum Windows in Commercial and Monumental Buildings. No. 53 CM.
2. Simplified Instructions for the proper handling and installation of Residential Double-Hung Aluminum Windows. No. 54 RDH.
3. Simplified Instructions for the proper handling and installation of Residential Casement Aluminum Windows. No. 54 RC.
4. Ever See A Window Talk About... Condensation!
5. Tips on Selecting Windows for your New Home.
6. Aluminum Windows—Selection and Detailing, reprinted from Progressive Architecture, April 1952.
7. Weather Tests Determine Rigid Window Specifications, reprinted from Progressive Architecture, March 1956.
8. The Care and Cleaning of Aluminum Windows During and After Construction.

*For copies of any of the above publications, write to
Aluminum Window Manufacturers Association, 75 West Street, New York City 6, N. Y.*

members

active members

**Alcasco Products — Division of
Detroit Gasket & Mfg. Company**
Detroit, Michigan

The William Bayley Company
Springfield, Ohio

Ceco Steel Products Corporation
Chicago, Illinois

Duralite Window Corporation
Knoxville, Tennessee

Michael Flynn Mfg. Company
Philadelphia, Pennsylvania

Luria Building Products, Inc.
Bristol, Pennsylvania

manufacturers of prime aluminum windows

Metal Arts Mfg. Company, Inc.
Atlanta, Georgia

**Reynolds Metals Company
Window Division**
Louisville, Kentucky

J. S. Thorn Company
Philadelphia, Pennsylvania

Universal Window Company
Berkeley, California

Ware Laboratories, Inc.
Miami, Florida

Windalume Corporation
Kenvil, New Jersey

Wisco Aluminum Corporation
Detroit, Michigan

associate members — class A

Aluminum Company of America
Pittsburgh, Pennsylvania

**Reynolds Metals Company
Aluminum Division**
Louisville, Kentucky

producers of prime aluminum

Kaiser Aluminum & Chemical Sales, Inc.
Chicago, Illinois

associate members — class B manufacturers of window accessories and erection companies

American Screen Products Company
Miami, Florida

The Bronze Craft Corporation
Nashua, New Hampshire

The Caldwell Mfg. Company
Rochester, New York

The Diversey Corporation
Chicago, Illinois

Grand Rapids Hardware Company
Grand Rapids, Michigan

Kane Mfg. Company
Kane, Pennsylvania

The Schlegel Mfg. Company
Rochester, New York

Standard-Thomson Corporation
Dayton, Ohio

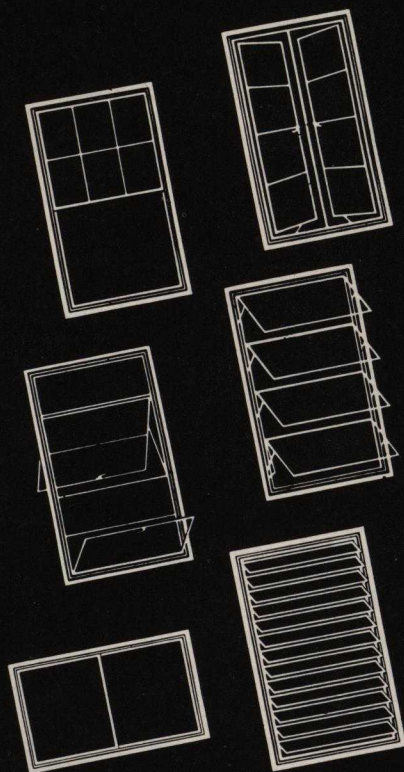
F. H. Sparks Company, Inc.
New York, New York

Tremco Mfg. Company
Cleveland, Ohio

Warren Supply
Miami, Florida



Aluminum Window Manufacturers Association
75 West Street New York 6, N. Y.



ALUMINUM WINDOWS

1957 SPECIFICATIONS

ADDENDA

TO 1957 EDITION
ALUMINUM WINDOW
SPECIFICATIONS

as published by
ALUMINUM WINDOW MFRS. ASSN.
and printed in
SWEETS' 1957 ARCHITECTURAL FILE
Section 17a/ALU

MARCH 1, 1957

NOTE: Important changes have been made in the wording of some window specifications. The revised sections are shown on Page 2. Please insert this ADDENDA within the pages of your Window Specifications Book (Sweets' Architectural File—Section 17a/ALU) where you can refer to it when writing specs for aluminum windows.



**QUALITY
APPROVED**
(TYPE)



A.W.M.A. Quality Specifications—Materials, Construction, Strength of sections and Air infiltration requirements—confirmed by PITTSBURGH TESTING LABORATORY.
MEMBER—ALUMINUM WINDOW MANUFACTURERS ASSOCIATION

type
double-hung
casement
projected
awning
sliding
jalousie

Specification and design check list
standard sizes

*Aluminum Window
Manufacturers Association*

75 West Street, New York 6, N. Y.

2
4
5
5
6
8
9
1
2
4
5
22
24
26

MARCH 1, 1957

AS PUBLISHED BY THE ALUMINUM WINDOW MANUFACTURERS ASSOCIATION
AND PRINTED IN SWEETS' ARCHITECTURAL

NOTE: Important changes have been made in the wording of all sections printed below. In writing specs for C-A1, C-A2, P-A2, DS-A1 or J-A1 windows, be sure to follow wording as given here, not as in original printing of the Specifications Book.

SECTION 1

1.7 SCREENS

PAGE
7

1.7.6 Aluminum screen cloth shall be woven in 18x14 mesh of .013 dia. aluminum clad 5056 alloy wire with suitable coating.

foot of crack length with ventilator in closed position and locked. The window tested shall be of a nominal size of 4'0" x 4'0" and shall have two ventilators, each being of a nominal size of 2'0" x 4'0". In weatherstripped windows, ventilators shall be equipped with metal or other approved-type weatherstripping.

SECTION 2

C-A1

CASEMENT WINDOWS FOR RESIDENTIAL-TYPE BUILDINGS

2.4.3 PERFORMANCE REQUIREMENTS

2.4.3.1 Physical Load Tests

NOTE: Sample submitted for Physical Load Tests shall be of standard construction containing outswinging ventilators of manufacturer's largest standard size in a window at least 5'9" x 5'3" or an area of 30 square feet.

A.—Vertical Deflection Test of completely assembled window, ventilator without muntins, unglazed, with manufacturer's standard hardware. A concentrated load of 45 pounds, acting at the lower unrestrained corner of a ventilator opened 90° shall not cause a vertical deflection at the lower unrestrained corner greater than $\frac{3}{8}$ inch per foot of ventilator width to be determined by the vertical bar centers, and at the conclusion of the test the ventilator shall properly close and operate.

PAGE
13

B.—Horizontal Deflection Test on ventilator installed in window frame, without muntins, unglazed, locking hardware in approximate center of ventilator side rail in locked position. A concentrated load of 20 pounds acting at either of the unrestrained corners of the ventilator shall not cause a deflection at the unrestrained corners greater than $\frac{3}{8}$ inch per foot of ventilator width to be determined by the vertical bar centers, and at the conclusion of the test the ventilator shall properly close and operate.

C-A2

CASEMENT WINDOWS FOR COMMERCIAL-TYPE BUILDINGS

2.5.3 PERFORMANCE REQUIREMENTS

2.5.3.2 Air Infiltration Test

When tested in accordance with the procedure as outlined in Section 1 under Air Infiltration, the air infiltration shall not exceed (A) in non-weatherstripped windows—one cubic foot; (B) in weatherstripped windows— $\frac{1}{2}$ cubic foot—per minute per

PAGE
15

P-A2

PROJECTED WINDOWS FOR COMMERCIAL-TYPE BUILDINGS

2.8.3 PERFORMANCE REQUIREMENTS

2.8.3.1 Physical Load Tests

A.—Torsion Load Test on unglazed window with projected-out ventilator open to 45°, securely clamped and continuously supported around the outside perimeter, one free corner of the open ventilator securely held in the 45° position by blocking between the corner of the ventilator and the fixed portion of the window. A concentrated load of 30 pounds acting from the outside, perpendicular to the plane of the fixed portion and applied to the free rail of the ventilator at the point of locking handle attachment, shall not cause a deflection at the free corner opposite the blocked corner, measured perpendicular to plane of fixed portion, greater than $3\frac{1}{2}$ ". The ventilator must open and close freely before and after the test when applying an operational force of not more than 15 pounds after vent is in motion.

PAGE
17

(Interpretation: "When opening and closing window with an operational force of 15 pounds, such test should begin with the ventilator open to a 45 degree opening.")

DS-A1

SLIDING WINDOWS FOR RESIDENTIAL-TYPE BUILDINGS

2.11.3 HARDWARE

The windows shall be equipped with locks and pulls of suitable materials, either aluminum, non-magnetic stainless steel or other non-corrosive material compatible with aluminum and shall be of sufficient strength to perform the functions for which it is used. Plated or coated materials not compatible with aluminum are not permitted unless properly insulated from the aluminum. Sash shall operate freely.

PAGE
20

J-A1

JALOUSIE WINDOWS FOR RESIDENTIAL-TYPE BUILDINGS

2.12.2 MATERIALS

Insert words in appropriate place "(accepted commercial tolerances)"

PAGE
22

THE FOLLOWING MEMBERS OF THE ASSOCIATION MANUFACTURE WINDOWS WHICH HAVE BEEN TESTED AND FOUND TO MEET THE REQUIREMENTS OF THE AWMA SPECIFICATIONS AS OF MARCH 1, 1957

DOUBLE-HUNG DH-A1

A.C.A. Window Corporation,
Wellwood Ave., Lindenhurst, N. Y. (ACA-2)
Albritton Engineering Corporation,
2501 Wroxtan Road, Houston, Texas (ALENCO SH)
Ceco Steel Products Corporation,
5601 West 26th St., Chicago 50, Ill. (Series 200B)
Michael Flynn Mfg. Co.,
700 East Godfrey Ave., Philadelphia 24, Pa. (Lupton DH)
Metal Arts Mfg. Co., Inc.,
Harwell & Oakcliff Rd., Atlanta, Ga. (Series 100E)
Reynolds Metals Company, (Window Division)
2000 So. 9th St., Louisville, Ky. (Series 2200 and 2300)
J. S. Thorn Company,
8501 Hegerman St., Philadelphia 36, Pa. (Series A-200)
Windalume Corporation,
Route 46, Kenvil, N. J. (Series 100)
Wisco Aluminum Corporation,
3900 "A" Street, Detroit, Michigan (Series 300)

DOUBLE-HUNG DH-A2

Ceco Steel Products Corporation,
5601 West 26th St., Chicago 50, Ill. (Series 200B)
J. S. Thorn Company,
8501 Hegerman St., Philadelphia 36, Pa. (Series A-4500, A5000)
Windalume Corporation,
Route 46, Kenvil, N. J. (Series 200)

DOUBLE-HUNG DH-A3

Ceco Steel Products Corporation,
5601 West 26th St., Chicago 50, Ill. (Series 200B)
J. S. Thorn Company,
8501 Hegerman St., Philadelphia 36, Pa. (Series A5000)
Windalume Corporation,
Route 46, Kenvil, N. J. (Series 300, 350)

CASEMENT C-A1

Alcasco Products, Div. Detroit Gasket & Mfg. Co.,
12640 Burt Rd., Detroit 23, Mich. (Series C-9)
Ceco Steel Products Corporation,
5601 West 26th St., Chicago 50, Ill. (Series 800, A2424-XW,
and A4524-XW)
Duralite Window Corporation,
Carr St. & Southern Ry., Knoxville, Tenn.
Michael Flynn Mfg. Co.,
700 East Godfrey Ave., Philadelphia 24, Pa. (Lupton RC)
Reynolds Metals Co. (Window Division)
2000 S. 9th St., Louisville, Ky. (Series 3000)
J. S. Thorn Co.,
8501 Hegerman St., Philadelphia 36, Pa. (Series A-100, A-104, A-105)
Universal Window Company,
950 Parker St., Berkeley 10, Calif. (Series C-100)
Ware Laboratories, Inc.,
3700 N.W. 25th St., Miami, Fla.

CASEMENT C-A2

Michael Flynn Mfg. Co.,
700 East Godfrey Ave., Philadelphia 24, Pa. (Lupton MC)
J. S. Thorn Co.,
8501 Hegerman St., Philadelphia 36, Pa. (Series A-175P, A-175C)

PROJECTED P-A1

Alcasco Products, Div. Detroit Gasket & Mfg. Co.,
12640 Burt Rd., Detroit 23, Mich. (Series P100)
The William Bayley Company,
1200 Warder St., Springfield 99, Ohio
Michael Flynn Mfg. Co.,
700 East Godfrey Ave., Philadelphia 24, Pa. (Lupton MP)
Miami Window Corporation,
P.O. Box 877, Intl. Airport Branch, Miami, Fla.

Reynolds Metals Co., (Window Division)
2000 So. 9th St., Louisville, Ky. (Models PJ94 and PJ102)
J. S. Thorn Company,
8501 Hegerman St., Philadelphia 36, Pa. (Series A-175P)
Universal Window Company,
950 Parker St., Berkeley 10, Calif. (Series S-300)
Ware Laboratories, Inc.,
3700 N.W. 25th St., Miami, Fla.
Windalume Corporation,
Route 46, Kenvil, N. J. (Series 500)

PROJECTED P-A2

Alcasco Products, Div. Detroit Gasket & Mfg. Co.,
12640 Burt Rd., Detroit 23, Mich. (Series P100)
The William Bayley Company,
1200 Warder St., Springfield 99, Ohio
Michael Flynn Mfg. Co.,
700 East Godfrey Ave., Philadelphia 24, Pa. (Lupton MP)
Miami Window Corporation,
P.O. Box 877, Intl. Airport Branch, Miami, Fla.
Reynolds Metals Co., (Window Division)
2000 So. 9th St., Louisville, Ky. (Models PJ94 and PJ102)
J. S. Thorn Company,
8501 Hegerman St., Philadelphia 36, Pa. (Series A-175P)
Universal Window Company,
950 Parker St., Berkeley 10, Calif. (Series S-300)
Ware Laboratories, Inc.,
3700 N.W. 25th St., Miami, Fla.
Windalume Corporation,
Route 46, Kenvil, N. J. (Series 500)

AWNING WINDOWS A-A1

Miami Window Corporation,
P.O. Box 877, Intl. Airt. Br., Miami, Fla. (Standard)
Reynolds Metals Co., (Window Division)
2000 S. 9th St., Louisville, Ky. (Series 4000, 5000)
Stanley Bldg. Specialties Co.,
1890 N.E. 146th St., No. Miami, Fla. (Model 40)
Universal Window Company,
950 Parker St., Berkeley 10, Calif. (Series M-200)
Ware Laboratories, Inc.,
3700 N.W. 25th St., Miami, Fla. (Ware Awning)

AWNING WINDOWS A-A2

Miami Window Corporation,
P.O. Box 877, Intl. Airt. Br., Miami, Fla. (Deluxe-Standard-Monumental)
Universal Window Company,
950 Parker St., Berkeley 10, Calif. (Series M-200)
Ware Laboratories, Inc.,
3700 N.W. 25th St., Miami, Fla. (Ware Awning, Ware Rite,
Ware Monumental Awning)

DOUBLE and SINGLE SLIDING WINDOWS DS-A1

Ceco Steel Products Corporation,
5601 West 26th St., Chicago 50, Ill.
Reynolds Metals Co., (Window Division)
2000 S. 9th St., Louisville, Ky. (Series 5100, 5200, 5700, 5800)
Stanley Bldg. Specialties Co.,
1890 N.E. 146th St., No. Miami, Fla. (24)
J. S. Thorn Company,
8501 Hegerman St., Philadelphia 36, Pa. (Series A-300)
Wisco Aluminum Corporation,
3900 "A" St., Detroit, Mich. (400)

JALOUSIE WINDOWS J-A1

Stanley Bldg. Specialties Co.,
1890 N.E. 146th St., No. Miami, Fla. (Models 10 and 11)
Ware Laboratories, Inc.,
3700 N.W. 25th St., Miami, Fla.

Aluminum Window Manufacturers Association

75 WEST STREET, NEW YORK 6, N. Y.

members as of March 1, 1957

active members

A.C.A. Window Corporation
Lindenhurst, N. Y.

Albritton Engineering Corporation
Houston 5, Texas

Alcasco Products — Division of
Detroit Gasket & Mfg. Company
Detroit, Michigan

The William Bayley Company
Springfield, Ohio

Ceco Steel Products Corporation
Chicago, Illinois

Duralite Window Corporation
Knoxville, Tennessee

Michael Flynn Mfg. Company
Philadelphia, Pennsylvania

Metal Arts Mfg. Company, Inc.
Atlanta, Georgia

Miami Window Corporation
Miami, Florida

manufacturers of prime aluminum windows

Reynolds Metals Company
Window Division
Louisville, Kentucky

Stanley Building Specialties Company
North Miami, Florida

J. S. Thorn Company
Philadelphia, Pennsylvania

Truscon Steel Division
Republic Steel Corporation
Youngstown, Ohio

Universal Window Company
Berkeley, California

Valley Metal Products Company
Plainwell, Michigan

Ware Laboratories, Inc.
Miami, Florida

Weather Wizard Aluminum Mfg. Corp.
Garden City Park, N. Y.

Windalume Corporation
Kenil, New Jersey

Wisco Aluminum Corporation
Detroit, Michigan

associate members — class A

producers of prime aluminum

Aluminum Company of America
Pittsburgh, Pennsylvania

Kaiser Aluminum & Chemical Sales, Inc.
Chicago, Illinois

Reynolds Metals Company—Aluminum Division
Louisville, Kentucky

associate members — class B manufacturers of window accessories and erection companies

American Screen Products Company
Miami, Florida

American Window Glass Company
Pittsburgh, Pennsylvania

The Bronze Craft Corporation
Nashua, New Hampshire

The Caldwell Mfg. Company
Rochester, New York

The Diversey Corporation
Chicago, Illinois

Grand Rapids Hardware Company
Grand Rapids, Michigan

Kane Mfg. Company
Kane, Pennsylvania

The Schlegel Mfg. Company
Rochester, New York

F. H. Sparks Company, Inc.
New York, New York

Standard-Thomson Corporation
Dayton, Ohio

Tremco Mfg. Company
Cleveland, Ohio

Warren Supply
Miami, Florida



**QUALITY
APPROVED**

(TYPE)

A.W.M.A. Quality Specifications—Materials, Construction, Strength of sections and Air Infiltration requirements—confirmed by PITTSBURGH TESTING LABORATORY.
MEMBER—ALUMINUM WINDOW MANUFACTURERS ASSOCIATION



Digitized by:



ASSOCIATION
FOR
PRESERVATION
TECHNOLOGY,
INTERNATIONAL

www.apti.org

**BUILDING
TECHNOLOGY
HERITAGE
LIBRARY**

<https://archive.org/details/buildingtechnologyheritagelibrary>

From the collection of:

**NATIONAL
BUILDING
ARTS
CENTER**

<http://web.nationalbuildingarts.org>